

PREFACE

The year 1998-99 marks the completion of ten years of existence of the Centre. The main goals and objectives for which this Centre was established in July 15, 1988, have been fulfilled. In the area of weather forecasting, the Centre has achieved success in developing numerical tools to predict annual rainfall well in advance. This approach has been supported by developing dynamical models for the structure and evaluation of atmospheric moisture field in the tropics, which use, among other things, the sea surface temperature as an important input. In the area of ocean modelling and forecasting, significant efforts are being made to predict the Indian Ocean state variables using the Modular Ocean Model (MOM). These results are also useful to predict marine primary productivity which is required, on one hand, for estimating the fisheries potential in estuaries and, on the other hand, for computing the CO₂-flux across the Indian ocean, an important input to global change studies. To estimate these changes, a coupled physical, biological and chemical model of the Indian ocean has been developed. Further, to assess the earthquake risks in the Indian region, we have been able to measure ongoing strain rates in the Indian continental region using GPS geodesy. The stability of the Indian shield and partitioning of the strain rates from Kanyakumari to Himalayan region have been constrained by these studies. These results will go a long way in the assessment of earthquake risks in the Indian region. In all our scientific and engineering endeavours, the role of nonlinear and stochastic effects are being specially studied with focus on understanding of the phenomena and also their predictability. Progress has been made in applications of nonlinear dynamical systems theory to various problems,

nonlinear signal processing, simulations of non-Newtonian fluid flow, and bioremediation. Progress achieved in all these areas during 1998-99 is reported in the following pages.

During the last decade, C-MMACS has been privileged to have its Advisory Committee chaired by Director Generals of CSIR: Dr. A.P. Mitra, FRS, Dr. S.K. Joshi and, now, Dr. R.A. Mashelkar, FRS; also very distinguished scientists and technologists are its members. Successive Directors of the National Aerospace Laboratories, Prof. R. Narasimha, FRS, Dr. K.N. Raju and, now, Dr. T.S. Prahlad, have all provided support to the research programs and to the staff of C-MMACS. Successive Secretaries of the Department of Ocean Development, Prof. V.K. Gaur and, now, Dr. A.E. Muthunayagam have been most supportive of the ocean modelling program. I would like to take this occasion to thank all these luminaries for their guidance and support. I also recall the distinguished services of former Head, Dr. K.S. Yajnik in laying the firm foundation from where newer enterprises can be undertaken. I would like to thank all the scientific staff of C-MMACS and Shri M.B. Ananda, Head, Technical Secretariat and his colleagues for their help and support during the year. Dr. N.K. Indira, Shri M.B. Ananda and Smt. A. Stella Margaret compiled this report. Dr. T.R. Krishna Mohan and Smt. S. Sita carried out the editing and word processing respectively. Finally, it was Mr. A.S. Rajasekar, Mr Santha Prakash Mathias and Dr. Srinivas Bhogle with other staff of ISS, NAL who designed and composed this report. I thank them all for their efforts.

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